

SWEET-SMELLING MONARDELLA

Monardella beneolens

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Management Status: Federal: BLM Sensitive
California: S1.3, G1 (CDFG, 1998)
CNPS: List 1B, R-E-D code of 3-1-3 (Skinner and Pavlik, 1994)

General Distribution:

Only three highly restricted populations of sweet-smelling monardella are known. All three occur along the crest of the southern Sierra Nevada in Kern, Inyo, and Tulare counties: Owens Peak on BLM managed land, Olancho Peak on USFS managed land, and Cottonwood Creek on BLM managed land (Shevock et al., 1989).

Distribution in the West Mojave Planning Area:

As noted above, two of the three known populations are on BLM managed lands at the western edge of the WMPA.

Natural History:

Sweet-smelling monardella (n=21) is a matted, loosely rhizomatous herbaceous perennial in the mint family (Lamiaceae). Its leaves and stems are covered with a mixture of fine glandular and spreading non-glandular hairs. The stems are up to 12 in. (30 cm) high and decumbent to erect, or sometimes branched. The 5-13 pairs of leaves on each stem are short petioled to nearly sessile. The ovate to narrowly triangular blades are densely hairy above and below and have undulating margins. The verticillasters (flower heads) are solitary, rarely occurring in whorls, or a panicle (Jokerst, 1993). The flowers are lavender to pale rose and bloom from July to September.

The matted habit and undulating leaves distinguish this species from other *Monardella* in the area. It appears to be most closely related to gray monardella (*M. cinerea*), endemic to the San Gabriel Mountains, and Arizona monardella (*M. arizonica*), endemic to Arizona desert ranges; but also shares similarities with two coastal dune species, crisp monardella (*M. crispa*) and San Luis Obispo monardella (*M. undulata* var. *frutescens* [= *M. frutescens*]), and two other geographically restricted species, Robison's monardella (*M. robisonii*) and Stebbins' monardella (*M. stebbinsii*) (Shevock et al., 1989; Hardham and Bartel, 1990). This species was first described in 1989 from a collection made at Olancho Peak in 1986. Subsequent searches of herbaria yielded unidentified/misidentified material of this species dating back to 1896 that had been collected from the known locations (Shevock et al., 1989).

The biology of this species is little-studied, but certain inferences can be drawn from the morphology of the plant. It appears from Figure 1 in Shevock et al. (1989) that the number of flowers per verticillaster can vary from 5-20 or more. The figure also indicates that there are 4 ovules per flower, as with other *Monardella*, for a maximum of four nutlets per flower. Seed production is thus about 20-80 seeds per verticillaster, but the number of verticillasters produced per plant in a year doubtless varies greatly between years and plants. There is no information on pollinators, seed dispersal mechanisms, or whether sexual reproduction is even important for the

sweet-smelling monardella. If pollination occurs, the typical *Monardella* pollinators, butterflies and bee-flies, may be the vectors.

Habitat Requirements:

This plant is found only in granitic soils on the slopes of subalpine coniferous forests/woodlands and alpine boulder and rock fields 8,200 to 11,000 ft. (2500 to 3500 m). It occurs near the summits "...on rocky granitic or metamorphic slopes...where rooting substrate consists of rocky scree..." (Shevock, et al., 1989). The terrain in these areas is very dry and "...extremely rugged, with steep terrain rising from the desert floor" (Shevock, et al., 1989). Figures in Shevock (1988) indicate that plants occur in full sun to partial shade, in areas with perhaps 5-30% total vegetation cover. The paratypes were taken from areas with west, south and east exposures (Shevock, et al., 1989). There are few associated species that occur with each of the populations. Each of the individual sites, however, does contain "...a surprisingly high concentration of rare localized southern Sierra Nevada endemics" (Shevock et al., 1989), such as Olancho Peak buckwheat (*Eriogonum wrightii* var. *olanchense*), DeDecker's clover (*Trifolium macilentum* var. *dedeckerae*), Owens Peak lomatium (*Lomatium shevockii*), and Gilman's goldenbush (*Ericameria gilmanii*), but no one associate occurs at all of the sweet-smelling monardella occurrences.

Population Status:

Sweet-smelling monardella is a very localized endemic restricted to just the three known populations mentioned above, but occurs in places far from the sorts of activities that typically pose threats to plant populations. In addition, it is anticipated that more populations will be discovered as surveys of the rugged, isolated crest of the southern Sierra Nevada continue (Shevock, et al., 1989).

There is no information on the population sizes of this plant (CDFG, 1997) and such information would be very difficult to obtain given the plants clonal nature and matted habit, with much reproduction being vegetative (Shevock; pers. comm., 1997). Distinguishing one individual from another except by electrophoresis, or other laboratory methods, may not be possible.

Threats Analysis:

No immediate threats to this species are listed with the California Natural Diversity Data Base (CDFG, 1997), and long-term threats are not obvious. Because all three populations occur on remote federal lands, there are no known threats to the habitat or range of the species caused by urban or private development or road maintenance. The rugged terrain and limited access to the occupied sites almost eliminates the potential threats from off highway vehicles. There are no known threats from mineral exploration and development, animal grazing, or water developments and impoundments.

There are no known threats from disease or predation, but these issues have not been studied. The greatest threat to this species is apparently its vulnerability to stochastic extinction events because only three distinct, highly restricted and small populations apparently exist (CDFG, 1997).

Genetic swamping is a potential threat from apparent hybridization with *M. linoides* ssp. *linoides* and *M. odoratissima* ssp. *pallida* (Shevock, et al., 1989). Hybridization is probably only a threat if it is being caused by some recent human disturbance of the habitat and not if it is due to

naturally occurring conditions. If the species have been in contact for hundreds of years, or millennia, but have maintained their distinctness under natural conditions, then there is no reason to anticipate that sweet-smelling monardella will be genetically swamped by its congeners in the foreseeable future.

There are currently no existing regulatory mechanisms protecting the sweet-smelling monardella. It has not been afforded protection under state or federal laws. However, all of the known populations are on federal lands and thus receive a degree of protection not afforded plants on private lands.

Biological Standards:

The most important consideration in attempting to maintain the long term viability and evolutionary potential of sweet-smelling monardella is to protect the known population sites and the areas supporting potential habitat from whatever future threats may arise. The immediate prerequisite for the effective management of this species is the comprehensive survey of all potential habitat areas to determine its precise status and distribution. While it is anticipated that more populations will be discovered as surveys of the southern Sierra Nevada continue (Shevock, et al., 1989), whether that is true will only be known after such surveys have actually been conducted. It is entirely possible (though unlikely) that, contrary to expectations, we presently know every existing population of the species. Until the distribution and ecology of this species are better understood, we must assume that the total extent of this species is these three populations, and formulate management plans accordingly.

Literature Cited:

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